UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Californians for Green Nuclear Power, Inc. Complainant	)	
v.	)	Docket No. ____
The North American Electric Reliability Corporation, the Western Electricity Coordinating Council, the California Independent System Operator, the California Public Utilities Commission, the California State Water Resources Control Board, & the California State Lands Commission	)	*Complaint*
Respondents	)	

COMPLAINT OF CALIFORNIANS FOR GREEN NUCLEAR POWER, INC.

Pursuant to the Federal Power Act, Energy Policy Act of 2005, the Natural Gas Act of 1938, the Federal Pipeline Safety Regulations, [1] and Section 206 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission,[2] Californians for Green Nuclear Power, Inc. ("CGNP") submits this Complaint against the North American Electric Reliability Corporation ("NERC"), the Western Electricity Coordinating Council ("WECC"), the California Independent System Operator ("CAISO"), the California Public Utilities Commission ("CPUC"), the California State Water Resources Control Board ("CSWRCB"), and the California State Lands Commission ("CSLC") alleging that the Respondents CPUC, CAISO, CSWRCB, and CSLC have violated federal reliability standards for the bulk power system through the CPUC's approval of the plan to close Diablo Canyon Power Plant ("DCPP") in 2025[3] without first properly analyzing the adverse bulk electric system and adverse bulk natural gas system consequences, in light of known

[1] The Federal Power Act, 16 U.S.C. §§ 791 et seq., the Energy Policy Act of 2005, 42 USC §13201 et seq. (2005), the Natural Gas Act of 1938 15 USC § 717(b) et seq., and Federal Pipeline Safety Regulations, 49 C.F.R. § 192 (2020).
[2] 18 C.F.R. § 385.206 (2020).
[3] CPUC Decision D.18-01-022

California-specific hazards, including those caused by seismic activity and the Public Safety Power Shutoff ("PSPS") policies enacted by Respondent CPUC[4].

Consequently, as described herein, Respondents NERC and WECC failed to conduct proper oversight or enforce NERC's reliability standards that will be violated by removing DCPP's 2,240 MW from the California electric grid.

Recent events, including the August, 2020 blackouts that affected millions of California utility customers, point to the underlying reliability issue facing California's electric grid, even with DCPP continuing to operate. The premature closure of DCPP will only exacerbate current reliability issues, and is inconsistent with federal law.

I. Description of The Complainant

CGNP is a 501(c)(3) non-profit organization dedicated to promoting the peaceful use of safe, carbon-free nuclear power. The Board and Members of CGNP include dedicated scientists, educated at top universities, considered to be elite specialists in their fields, with decades of experience on issues of power generation, grid safety, and emissions reduction.

II. Summary of the Complaint and Relief Requested

In August 2020, the lights went out in California. For the first time since the year-2000 power crisis, Respondent CAISO ordered rolling blackouts across the state of California. The August 2020 heat wave, that strained an already overloaded system, combined with California's non-firm renewable generation resources consisting of 13,383 MW of installed large-scale solar and 6,977 MW wind generation to lead CAISO to order rolling blackouts, when reserve capacity dropped to critical levels.[5]

Section 215 of the Federal Power Act (FPA), enacted as part of the amendments to the FPA contained in the Energy Policy Act of 2005, created the current mandatory reliability standards and enforcement mechanism that protect the reliability of the bulk power system. Section 215 required FERC to designate a certified Electric Reliability Organization (ERO) to develop mandatory and enforceable Reliability Standards. FERC certified NERC as the ERO and approved eight "regional entities" including WECC to serve as regional compliance authorities.

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[4] See California Public Utilities Code Sections 451 and 399.2(a).

[5] "Rolling blackouts expected today for 'millions' in California, energy officials warn" by Dale Kasler, August 17, 2020, *The Sacramento Bee.* https://www.sacbee.com/article245022345.html

NERC, has proposed, and the Commission has approved, more than 100 mandatory Reliability Standards that address many facets of maintaining and improving the reliability of the bulk power system. These Reliability Standards may be enforced by NERC, subject to Commission oversight, or by the Commission independently.

On August 11, 2016, PG&E filed its application before Respondent CPUC proposing to retire DCPP upon the expiration of its Nuclear Regulatory Commission licenses, which expire on November 2, 2024 for Unit 1 and August 26, 2025 for Unit 2.

Following proceedings held before the CPUC, on January 11, 2018, PG&E's application to retire DCPP was approved. In their ruling on the application the CPUC did not issue a determination regarding the electricity procurement that would be needed to replace DCPP's 2,240 MW, but instead left consideration of this critical reliability issue to be considered in the future as part of the CPUC's Integrated Resources Procurement proceeding.[6]

DCPP is perhaps the key element of California's bulk power system and its largest generator by far, producing about 10% of in-state generation, the equivalent of almost five Hoover Dams of electricity annually.[7] DCPP also has an important role in providing reliable, fuel-secure, electricity generation, as DCPP operates independently of California's aging and vulnerable bulk natural-gas transmission and storage system. And DCPP produces all of this electricity day-in, day-out, rain or shine, without any greenhouse-gas emissions.

Rather than serving as an isolated incident, the August 2020 blackouts point to much larger systemic reliability challenges that will only be made worse by the voluntary closure of DCPP. Approximately 60% of California's dispatchable in-state bulk electric generation system is powered by natural gas, so the reliability of California's bulk electrical system is tightly coupled to the reliability of California's natural gas bulk transmission and storage system. 95% of California's natural gas is imported from out of state via the bulk natural gas transmission system. Furthermore, about 1/4 to 1/3 of California's electricity is imported from out of state.

As described in more detail below, there are present reliability challenges to the California natural gas bulk transmission and storage system that are a consequence of its vulnerability to

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[6] Id.

[7]" In 2015, Hoover Dam generated about 3,700 MWh" or 3.7 TWh, thus DCPP generated 4.86 times the 2015 production of Hoover Dam. Per the U.S. Department of Reclamation, 2007 Hoover Dam production was 3.825 TWh. Diminishing production is a consequence of the western U.S. megadrought which began 2 decades ago. - Testimony regarding S.2902 before the U.S. Senate Subcommittee on Water and Power of Tom Buschatzke, Director of the Arizona Department of Water Resources
https://www.energy.senate.gov/services/files/22F5E46F-7AEF-4767-9D45-9FE01271C660

sudden earthquake motions and slow aseismic (without an earthquake) creep caused by the relative motion of Earth's crustal plates in California.

Furthermore, additional bulk electrical system reliability challenges are associated with the PSPS policies, which will now likely encompass both the transmission and distribution ("T&D") electricity systems within the Pacific Gas and Electric Company ("PG&E") service territory.

As Complainant CGNP demonstrates more fully below, there are significant reliability benefits to both the bulk electrical and bulk natural gas systems in California associated with the continued safe operation beyond 2025 of PG&E's DCPP[8] as well as the re-commissioning of the San Onofre Nuclear Generating Station ("SONGS") that ceased operations in 2012.

Respondents CPUC, CAISO, CSWRCB, and CSLC have violated NERC's reliability standards for the bulk power system through the approval of the voluntary plan to retire DCPP in 2025[9] without first properly analyzing the adverse bulk electric system and adverse bulk natural gas system consequences. Respondents FERC, NERC, and WECC failed to conduct proper oversight or enforce NERC's reliability standards to prevent reliability standards violations caused by removing DCPP's 2,240 MW from the California electric grid.

CGNP respectfully requests that FERC takes action to enforce NERC's reliability standards, as well as review and initiate remediation of the significant reliability concerns raised in this complaint.

III. Correspondence and Service

All correspondence and communications with respect to this filing and the above captioned proceeding should be addressed to:

Californians for Green Nuclear Power
1375 East Grand Ave, Suite 103 #523
Arroyo Grande, CA93420
government@CGNP.org

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[8] "Nuclear better option than natural gas," by Gene A. Nelson, Ph.D. CGNP Legal Assistant, September 1, 2020 10:00 PM EDT, ***The Free Lance - Star*** (Fredericksburg, Virginia) https://tinyurl.com/Nuclear-Advantage
Letter to the Editor in response to ***Free Lance - Star*** Editorial, "A cautionary energy tale from California," August 29, 2020, https://fredericksburg.com/opinion/editorial-a-cautionary-energy-tale-from-california/article_a4401ba1-7f90-5d6c-82e7-fac5644ed041.html See also "A plan for solving California's energy problem: Dan Brouillette," by Dan Brouillette, September 25, 2020, ***The Los Angeles Daily News***. https://www.dailynews.com/2020/09/25/a-plan-for-solving-californias-energy-problem-dan-brouillette/
"State needs common-sense energy policy," by Michael B. Stoker, October 11, 2020, ***Santa Barbara News Press***. https://newspress.com/state-needs-common-sense-energy-policy/

[9] CPUC Decision D.18-01-022

IV. Complaint

In compliance with Rule 206 of the Commission's Rules of Practice and Procedure, CGNP submits the following information:

A. Rules 206(b)(1) and 206(b)(2): Factual and Legal Basis for Complaint

The totality of the evidence in the public record shows that California's power-generation system is in a precarious state, even with DCPP operating. Removing DCPP from the mix will result in a lack of reliability in violation of FPA Section 215 *et seq.*

On August 11, 2016, PG&E filed its application before Respondent CPUC proposing to retire DCPP upon the expiration of its Nuclear Regulatory Commission licenses, which expire on November 2, 2024 for Unit 1 and August 26, 2025 for Unit 2.

Following proceedings held before the CPUC, on January 11, 2018 PG&E's application to retire DCPP was approved. In their ruling on the application the CPUC did not issue a determination regarding the electricity procurement that would be needed to replace DCPP's 2200 MW, but instead left consideration of this critical reliability issue to be considered in the future as part of the CPUC's Integrated Resources Procurement proceeding.[10]

When the CPUC issued Decision D.18-01-022 approving retirement of DCPP, the CPUC failed to perform a reliability analysis of California's electric and natural-gas systems following an inevitable large-scale earthquake (and/or aseismic creep) such as documented by the 2008 USGS "Shakeout Scenario" (discussed below) that will cause significant and challenging-to-repair damage to California's bulk natural gas transmission and storage system - and to the bulk power system.

Through Respondents' actions to approve the DCPP retirement application CPUC, CAISO, CSWRCB, and CSLC have violated NERC's reliability standards for the bulk power system through approving DCPP's retirement[11] without first properly analyzing the adverse bulk electric system and adverse bulk natural gas system consequences, in light of known California-specific hazards including those caused by seismic activity and the PSPS policies enacted by Respondent CPUC.[12]

In addition, Respondents FERC, NERC, and WECC failed to conduct proper oversight or enforce NERC's reliability standards that will be violated by removing DCPP's 2,240 MW from the California electric grid.

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[10] Id.
[11] Id.
[12] See California Public Utilities Code Sections 451 and 399.2(a).

As detailed throughout, CGNP's complaint establishes the need for an in-depth FERC reliability analysis regarding how DCPP protects California's public safety, benefits ratepayers, and prevents air pollution at all times with a particular focus during and after large California earthquakes and during PG&E PSPS events. Furthermore, as a consequence of the history of politics clouding this controversy, CGNP respectfully submits that there is a need for the organization to be a stakeholder with a guaranteed right of appeal during the FERC reliability analysis.

1. **DCPP protects the reliability of California's bulk power system - and indirectly protects the reliability of California's natural gas transmission and distribution system**

About 60% of California's dispatchable in-state generation is powered by natural gas (with 95% of that natural gas imported from out of state.) Thus, California's electricity and gas systems are tightly coupled. Clearly, either manmade or naturally caused disruptions to California's bulk natural gas transmission and storage system will likely cause immediate and harmful disruptions to California's bulk power system.

Natural gas is a "just in time" energy source that has significant mass and transmission speed through the bulk gas distribution system is a modest 15 miles per hour.[13] However, even partial disruptions to California's bulk gas transmission system have the potential to disrupt reliable natural gas system operation to a supplied area. Thus, the continued safe operation of DCPP, that is not reliant on natural gas, would increase the reliability of California's bulk gas transmission system from such disruptions by reducing demand on California's gas system for electricity generation during inevitable natural gas supply constraint events.

Both scientific studies and real-world evidence support CGNP's significant concerns regarding the reliability of the California's bulk natural gas system, that will be put under even greater pressure with the closure of DCPP.

The scientific studies and models that have been conducted paint a grim picture of the impacts of various earthquake scenarios on the natural gas transmission and storage system. The United States Geological Survey (USGS) 2008 "Shakeout Scenario" study, modeling where a 7.8 magnitude earthquake occurs during the rupture of the southern section of the San Andreas Fault highlights the significant vulnerability of underground bulk natural gas pipelines that carry natural

[13] https://www.pgesafetyeducation.com/school/ngas_safety-smart/66771_tell_me_more/index.html (Bullet point 16)

gas into California from other states.[14] The second USGS earthquake scenario is a magnitude 7.0 earthquake occurring on the Hayward Fault, referred to as the 2017 "Haywired Scenario"[15]

In addition to the scientific research noted above, there are numerous real-world examples of the fragility of the natural gas system. The resources contained in the included Appendix B document federal concern regarding the vulnerability of the natural gas pipeline system dating back to 1992.[16]

The events in Newport, Rhode Island starting on January 25, 2019 offer a cautionary example that illustrates that the loss of the natural gas supply to an area causes significant safety and welfare problems.[17]

There are likely to be hundreds of instances where a natural gas transmission line crosses a California earthquake fault that is undergoing aseismic creep causing geometrical distortion of the natural gas transmission line. Scientists from CGNP recently identified and documented such a natural gas transmission line running from Avenal, California to Paso Robles, California - line number 44-1088, installed in 1937, being bent by aseismic creep (in northeast San Luis Obispo County, California.) This natural-gas transmission line crosses the San Andreas Fault above the ground near Cholame, California. The calculated creep at this location is the product of 83 years and 3.5 cm/year (1.38 inches) creep, or 290.5 cm (114.4 inches) total creep. Since the observed pipeline bending is about 32 inches, this suggests this section of the pipeline was repaired about 23 years ago, or about 1997. Subsequent maintenance of this span (number 140) was documented in a California State Water Resources Board Region 3 permit in a March 8, 2012 application.

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[14] United States Geological Survey (USGS) 2008 "Shakeout Scenario", https://tinyurl.com/Ballantyne-2008

[15] 2017 Hayward Scenario, **https://pubs.usgs.gov/fs/2018/3016/fs20183016.pdf.** For background information, a relevant video introducing seismic engineering concepts is the hour-long 1994 NOVA science documentary, "Killer Quake," that offers a good discussion of the San Andreas Fault strike-slip faulting. Blind-thrust faults such as the Northridge Earthquake are discussed. The section on the "Earthquake Machine" beginning at 21:35 is particularly informative. Killer Quake, available at **https://www.youtube.com/watch?v=z5iY9wdcqdQ.** A DVD of the entire episode is available for purchase from NOVA WGBH-Boston.

[16] See Appendix B

[17] "Newport, R.I., suffers through days-long natural gas outage" By Michael Levenson and Matt Rocheleau, January 25, 2019, The Boston Globe
https://www.bostonglobe.com/metro/2019/01/25/rhode-island-community-suffers-through-days-long-natural-gas-outage/LsRGhqefBH4vNlwQOUrWmJ/story.html

Figure 1. 10.82 inch outside diameter Sempra natural gas bulk transmission Line 44-1088 placed above ground where it crosses the San Andreas Fault in northeast San Luis Obispo County, California. The pipeline is bent in two planes by aseismic creep in the vicinity of the San Andreas Fault. Similar distortions are occurring for the four buried pipelines carrying hydrocarbons in the vicinity of this bent pipeline. The camera is pointed westward. Both of the survey markers are 8.5 by 11 inches. The yellow survey marker shows an estimated extension of the centerline of this pipeline from the eastern ground exit point. (The marker center to pipe centerline distance is 32 inches.) The orange survey marker shows where the western end would be after an abrupt earthquake-induced movement of 120 inches to the northwest. CGNP affirms this image is a true and accurate reproduction of the original image. For additional details see the Appendix. *Image acquired on July 31, 2020. Copyright © 2020 by CGNP. Reproduction permitted with source attribution.*

Figure 2. The bent 10.82 inch OD Sempra natural gas transmission pipeline 44-1088 shown in Figure 1 pictured from the westernmost end. CGNP affirms this image is a true and accurate reproduction of the original image. Image acquired on July 31, 2020. Copyright © 2020 by CGNP. Reproduction permitted with source attribution.

It is well-known and generally understood that the San Andreas Fault could rupture at any time, causing a disruption to the natural gas system in the area served by this pipeline. *See* the additional references in Appendix 1.

In CPUC Decision D.20-03-018 with a date of issuance of March 27, 2020 regarding PG&E's Application A.19-04-003 (*See* A1904003...pdf found in Appendix 1) to sell its Line 306 to SoCalGas to replace Line 44-1088, the requirement that Line 306 be upgraded by SoCalGas to the reliability standard that applied to Line 44-1088 for crossing any active earthquake fault appears to be

absent.[18] Furthermore, any upgrades to the valves on Line 306 should permit in-line-inspection with technology currently being applied to SoCalGas's Line 235-2, another bulk gas transmission line that crosses many active earthquake faults. (see Sempra Lines 235 and 3000...pdf in Appendix 1) CGNP's detailed inspection of Google's "satellite views" in the vicinity of where PG&E Line 306 crosses the San Andreas Fault shows that Line 306 is underground at the fault crossing. Since Line 306 was constructed in 1962, the accumulated creep on the Pacific Plate side relative to the North American plate side is the product of 58 years and 3.5 cm/year (1.38 inches) creep, or 80.04 inches (almost 7 feet) of accumulated creep.

Such a large value of accumulated creep for Line 306 across the SAF zone raises serious reliability and safety concerns.

Figure 3. *(Previous page)) Sign on fence around three PG&E Line 306 valves near Cholame Valley Road. Photo taken by CGNP. © 2020. CGNP believes the "26" on the sign LINE 306 M.P. 26MLV refers to a 26-inch diameter pipeline. CGNP located a PG&E Line 306 easement description referring to a 24-inch pipeline. Reproduction permitted with source attribution.*

Figure 4. *(Above) Google "satellite view" of PG&E Line 306 showing the three valves inside a fence shown in Figure 3 in the vicinity of Line 306 crossing the San Andreas Fault (SAF.) Line 306 is not placed above the ground where it crosses the SAF just to the northeast of this image as is SoCalGas Line 44-1088, about five miles to the southeast.*

Figure 7. Wrinkled Pipeline Failed in Compression

When an earthquake on the southern portion of the San Andreas Fault occurs, California's underground natural gas and hydrocarbon pipelines will likely be seriously damaged by earthquake

[18] See 49 CFR § 192.317 regarding protection of natural gas transmission lines from physical hazards.

motions. Ballantyne[19] documented some of this likely damage to natural-gas pipelines in his 2008 report to the U.S. Geological Service. A photo from that report on the previous page shows a natural gas pipeline failed in compression during an earthquake. Note the hand in the upper left hand corner for scale. Note also how the anti-corrosion coating is damaged by wrinkling which causes stress corrosion cracking of the pipeline walls. Moreover, as a consequence of the non-uniform creep of the Pacific Plate relative to the North American Plate, there will likely be regions of natural gas pipelines on the Pacific Plate being compressed, bent, or wrinkled by aseismic creep.

In addition to the examples discussed above, data from the federal Pipeline and Hazardous Materials Safety Administration ("PHMSA") shows a widespread California natural gas transmission pipeline problem. The below data extracted from a PHMSA spreadsheet of failures since 2010 of onshore California natural gas transmission pipelines indicates a cause of "corrosion." Three of the four shown are in areas with nearby active earthquake faulting.[20]

Owner	Date	Latitude	Longitude	NRC Number
Sempra	10/1/2017 10:42	34.74281	-116.67346	1192024
PG&E	12/23/2014 4:00	39.565789	-121.68894	1104165
PG&E	10/15/2014 13:00	37.40055	-121.96572	1099669
PG&E	9/19/2011 18:45	38.1178829	-122.5670993	990236

As demonstrated in the above information, the California bulk natural gas system is subject to numerous risks and has a history of reliability and safety issues. CGNP respectfully requests that FERC order this reliability analysis, including clarifying how DCPP mitigates against these inevitable bulk electric power and natural-gas system disruptions from large-scale California plate tectonic activity, including aseismic creep, to be either made public if it has already been performed, or in the alternative, perform this reliability analysis for FERC within the next twelve months.

2. DCPP Protects California's Bulk Power System during PG&E's PSPS Events

In addition to the natural-gas bulk transmission system reliability vulnerabilities discussed above, further reliability concerns are raised by the PG&E PSPS policy approved by the CPUC. DCPP helps protect the reliability of the California bulk power system during a PSPS event.

[19] Shakeout Scenario Pipelines Ballantyne - 2008.pdf Ballantyne's 10 page report is contained in Appendix 1.

[20] The four National Response Center (NRC) incident reports from PHMSA detailing these incidents are attached as Appendix 1 to this complaint.

Bulk power transmission from PG&E's 167 hydroelectric dams and power imports from the north will likely be curtailed during some upcoming PSPS events. On the other hand, DCPP's three feeds to California's 500 kilovolt AC "backbone" network are likely to be unaffected by PG&E's PSPS events. See CGNP's attached filings in CPUC Proceeding R1602007, the natural gas reliability proceeding, for significant details.

The recent experiences of deadly wildfires in Northern California, along with regulatory, judicial, financial, and political demands that PG&E operate in a safer manner, guarantee additional PSPS events, cutting power to millions in Northern California.

3. Non-dispatchable solar and wind cannot contribute to California power system reliability.

Important when evaluating the reliability impacts to California's bulk power system of DCPP's closure in the non-firm/non-dispatchable nature of many of the renewable sources of electric generation in California. For reliability, California needs a large supply of economical, dispatchable power. There are two key zero-emission generation means (nuclear and large hydro) which are omitted from the graph in this recent *Wall Street Journal* article.[21] This article also notes non-dispatchable California solar and wind's power contributions were diminished (which increased natural gas demand) by the combination of wildfire-caused haze - diminishing solar - and the large high-pressure area over the Great Basin to the east of the state diminishing wind. WECC recently asserted that California solar provides a relatively limited reliability benefit during peak demand hours. [22]

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[21] "Why California Keeps Having Blackouts - Much like two decades ago, when it faced rolling blackouts, the Golden State has to buy sizable volumes of electricity on the spot market—this time as solar power fades out," By Rebecca Smith and Katherine Blunt, Aug. 23, 2020 12:00 pm ET, *The Wall Street Journal* https://www.wsj.com/articles/why-california-keeps-having-blackouts-11598198401

[22] Western Interconnection Gas – Electric Interface Study Public Report, June 2018 - WECC https://www.wecc.org/Administrative/WECC%20Gas-Electric%20Study%20Public%20Report.pdf The report confirms without objection the increased California natural gas burn for electric generation connected with the plan to retire DCPP in 2025. (Page 7 graph) "New investments in solar resources provide relatively limited reliability benefit because most of the unserved energy occurs during periods of waning solar production. In fact, adding 30,000 MW of additional solar PV resources across the Southwest and Southern California is not sufficient to eliminate the unserved energy observed in this scenario." (See graph on Page 22) Battery storage is expensive **($12 to 18 billion)** page 22. However, the study authors fail to mention the short operational lifetimes batteries of 7 to 10 years.

CEC 2018 Total System Electric Generation [23]

Fuel Type	California In State Dispatchable (GWh)	California Dispatchable %
Large Hydro	22,096	14.395%
Natural Gas	90,691	59.082%
Nuclear	18,268	11.901%
Zero-Emission	40,364	26.296%
Polluting	90,691	59.082%
Total	131,055	85.378%

Total 2018 in-state generation: 194,842 GWh. Imports added 90,646 GWh

Part of the problem can be attributed to California's policymakers, who appear to desire to create the impression that natural gas isn't a critical part of California's generating mix, *while natural gas powers almost 60% of California's in-state dispatchable generation.*

For example, when SoCalGas needed to make some repairs on its pipelines crossing the desert in mid-October, 2019, they quietly shut down about half of Sempra's natural-gas-fired generators in San Diego County, California. (There have been subsequent similar short-duration southern California generator curtailments.)

The ongoing repairs on SoCalGas's line 235-2 between Newberry Springs and Valencia, California since that line exploded on October 1, 2017 are causing natural-gas supply shortages in southern California during times of extreme power demand. Here's recent evidence of that supplied by SoCalGas's ENVOY ® website.

A total of **2.346** billion cubic feet (Bcf) of natural gas was withdrawn between August 13-20 from the 86 Bcf Aliso Canyon Storage Field (ACSF.)[24]

Date	Withdrawal, Bcf
13-Aug-20	0.290
14-Aug-20	0.503
15-Aug-20	0.209
16-Aug-20	0.187
17-Aug-20	0.374
18-Aug-20	0.407

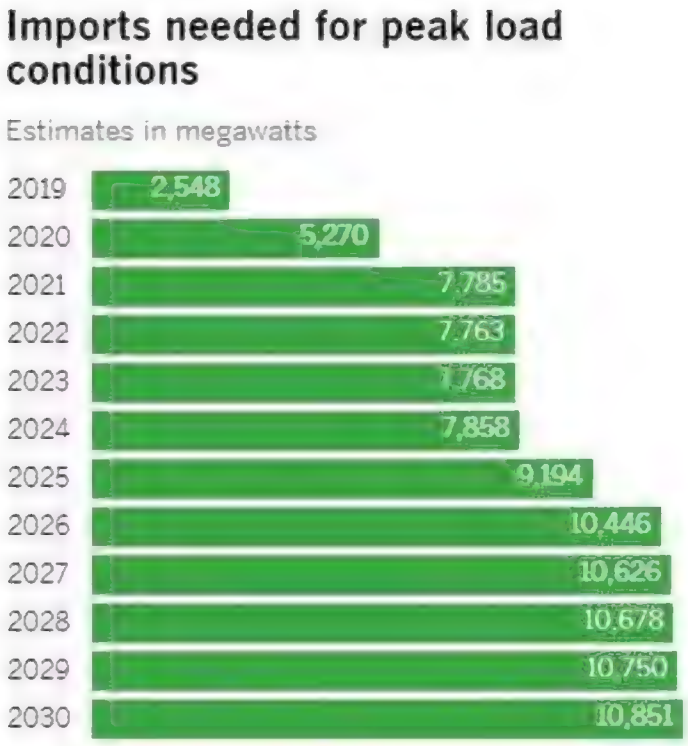
[23] **https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2018-total-system-electric-generation** (Retrieved 08 13 19 by CGNP)

[24] Envoy, available at, **https://www.socalgas-envoy.com** (Select "Critical" category at left. Select Aliso Canyon Storage Field Utilization listings)

19-Aug-20	0.226
20-Aug-20	0.150
Total	**2.346**

California already has huge amounts of pumped hydroelectric storage that was installed about four decades ago. While PG&E, the owner of the 1,212 MW Helms Pumped Storage blocked CGNP's data query during the 2016 CPUC proceeding A.16-08-006 to close DCPP in 2025, the evidence supports the perspective that Helms (and Castaic) are being used to provide ancillary services - namely to stabilize the California power grid while the large amounts of solar (13,383 MW) and wind (6,977 MW) destabilize the grid with random and predictable output changes.

Evidence suggests that Helms has been transformed from "the world's largest storage battery" (a label applied by PG&E 4 decades ago) to a very expensive resistor[25]. If large amounts of battery electric storage are procured, the purpose will likely be for more highly-compensated ancillary services, not bulk energy storage. However, as the events on April 19, 2019 at the McMicken 2 MW battery storage installation in Surprise, Arizona show[26], batteries are far more expensive, dangerous, and short -lived than California pumped hydro.



The increased consumption of natural gas that accompanies such large amounts of California solar and wind

[25] In 2018, 1,212,364,607 kWh of energy was used for pumping (Line 10,) 428,311,583 kWh net output for load [35.33% efficient] (Line 11,) thus, the 784,053,024 kWh difference is calculated dissipation. Helms should be 75% **efficient**. Plant cost [circa 1984] (Line 21:) $1,006,712,301 Source: PG&E 2018 FERC Form 1, Page 351 of 494 https://www.pge.com/pge_global/common/pdfs/about-pge/company-information/regulation/FERCForm1.pdf

[26] "'Reasons that are still unknown': 30 experts investigate Surprise battery explosion that injured 9," by Ryan Randazzo, April 23, 2019, *The Arizona Republic*. https://www.azcentral.com/story/money/business/energy/2019/04/23/arizona-public-service-provides-update-investigation-battery-fire-aps-surprise/3540437002/

which causes inefficient ramping is summarized well in this recent thermal efficiency analysis by the California Energy Commission. "Ramping and cycling result in increased fuel consumption." [27]

An August 21, 2020 preliminary analysis by Gridwell Consulting for CAISO's Western Power Trading Forum (WPTF) was summarized in an August 25, 2020 *San Diego Union Tribune* article, which is the source of the graphic on the previous page.[28]

B. Rules 206(b)(3) and 206(b)(4): Business, Commercial, or Economic Issues and Good Faith Estimate of Financial Impact or Burden

There are serious social and economic costs associated with a lack of power after a large-scale California earthquake or during a PG&E PSPS event.[29] Reliable electric power is required to pump water over the mountains into the Los Angeles basin or through city mains to fight fires. History has shown that the 1906 San Francisco earthquake's greatest toll (up to 90%) was from the conflagration following the earthquake, not the earthquake itself.[30]

Reliable electric power is required for first responder infrastructure. Reliable power is required for hospitals. Reliable electric power is required for all 39 California military bases.

In the 2008 USGS Shakeout Scenario mentioned above, experts from Southern California Edison estimated it would require only two weeks to re-route power to the surrounding area from the then-operating San Onofre Nuclear Generating Station (SONGS.) Since DCPP is on the same side of the Pacific Plate as the majority of Californians, power restoration after the earthquakes previously described could be even faster.

Beyond the economic and social costs of the reliability issues that will potentially be worsened due to the closure of DCPP, there are additional economic and social costs associated with

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[27] "Staff Paper - Thermal Efficiency of Natural Gas-Fired Generation in California 2019 Update," California Energy Commission, June 9, 0220.
httpellefiling.energy.ca.goviGetDocumentaspx?tn=233380&DocumentContentId=65895
The sentence "Ramping and cycling result in increased fuel consumption." is found in the paragraph below a heat rate trends chart describing how intermittent solar and wind cause ramping and cycling in the natural gas fired generation that firms those generation means. The analysis in the reports from earlier years is not as forthright.

[28] "Preliminary Assessment of California ISO System Conditions during August Heat Wave," August 21, 2020, by Carie Bentley, Gridwell Consulting - Prepared for the Western Power Trading Forum.
https://dfb97770-7344-44b9-889b-04db60882823.filesusr.com/ugd/fe68bf_4f17ee437638449896a6cc2a00e1ccb5.pdf
"A lesson from the blackouts: California may be too reliant on out-of-state energy imports - About 25 percent of the state's power comes from neighboring states," by Rob Nikolewski, August 25, 2020, The San Diego Union Tribune.
https://tinyurl.com/Gridwell-Report

[29] See Appendix 2. Selected CGNP filings from CPUC Proceedings R1602007 and R2001007 are included.

[30] https://en.wikipedia.org/wiki/1906_San_Francisco_earthquake#Fires The previously-referenced 1994 Nova science documentary, "Killer Quake" also raises these concerns.

the replacement of the 2,240 MW of power supplied by DCPP. Based on the experience of every U.S. nuclear power generator being retired, the dispatchable nuclear power generator will be replaced with dispatchable thermal generation. In California, that means replacement with natural-gas-fired generation with its attendant air pollution.

Per PG&E's 2018 FERC Form 1, Line 35 "Expenses per net KWh" supplied to the CPUC, DCPP undercuts the cost of PG&E's thermal production. The weighted average of PG&E's three large natural-gas-fired generators is calculated at $0.0384 per kilowatt-hour (KWh.) Since DCPP's 2018 production cost was $0.0291 per KWh, the difference is equal to $0.0093 per KWh. DCPP's 2018 annual production as a baseload generator was 18,265,519,000 KWh. The product of the difference between DCPP's cost and PG&E's weighted average natural gas fired generation cost is $170,222,001.09. Since until 2010, PG&E planned to relicense DCPP for the NRC standard 20 years, that is the appropriate planning horizon. Thus, the 20-year incremental ratepayer burden for replacing DCPP with natural-gas-fired generation is $3,404,441,621.79. As is shown below, this is the lower bound value.

Generator	Expenses per KWh	Annual generation, KWh	% of thermal Generation
DCPP	$0.0291	18,265,519,000	N/A
Colusa	$0.0340	2,991,759,812	0.4737
Gateway	$0.0386	2,939,850,866	0.4654
Humboldt	$0.0714	384,780,571	0.0609
Total PG&E thermal generation		**6,316,391,249**	
Weighted Average Thermal Generation Expenses	**$0.0384**		
			Cost
Annual ratepayer cost of replacing DCPP with PG&E Thermal Generation	**$0.0093**	**18,265,519,000**	**$170,222,081.09**
2025-2045 ratepayer burden			**$3,404,441,621.79**
Data source: PG&E 2018 FERC Form 1 supplied to CPUC			

As a check for consistency, CGNP recently supplied a spreadsheet (shown on the next page) to the San Luis Obispo County, California Board of Supervisors estimating the wholesale fuel cost of the natural gas required to replace DCPP at $313.3 million per year, yielding a 20-year ratepayer cost of $6.27 billion for the replacement natural gas. (As in the case of the January, 2012 SONGS shutdown, some of this incremental natural gas consumption would occur in existing generators. To the extent that new natural-gas-fired generation would be required if DCPP were shut down, the

Levelized Cost of Energy [LCOE] of the replacement energy must include the cost of any required new generation and new transmission facilities. The 2020 cost range for the more efficient combined cycle gas turbine generation was $72.60 to $75.20/MWh.)[31]

Year	Load Following Heat Rate	Load Following Capacity Factor	Product	Peaker Plant Heat Rate	Peaker Capacity Factor	Prodiuct	Sum of Products	Sum of Capacity Factors	Weighted Average
2011	7,331	0.354	2,595	10,698	0.034	364	2,959	0.388	7,626
2012	7,239	0.514	3,721	10,838	0.048	520	4,241	0.562	7,546
2013	7,244	0.485	3,513	10,363	0.045	466	3,980	0.530	7,509
2014	7,332	0.494	3,622	10,402	0.058	603	4,225	0.552	7,655
Four-Year Weighted Average (BTu/kwh)									**7,584**

Source: Table 5: Average Heat Rates From Load-Following and Peaking Resources (Btu/kWh): 2001 to 2014
Estimating Near-Term Grid Operation and Marginal Resource Efficiency for California Electricity
California Energy Commission, March 2016
https://ww2.energy.ca.gov/2016publications/CEC-200-2016-003/CEC-200-2016-003.pdf

DCPP Annual Nominal Generation : 18 billion kwh/year
Annual MMBTu of Natural Gas to equal DCPP Replacement Generation **136,511,224**
Using the equivalence of 0.9643 BCF natural gas = 1 million MMBTu, this equals **131.64 BCF**
Per https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SCA_m.htm,
1 MMBTu of natural gas had an April, 2020 calculated California citygate price of $2.295
Thus, the California citygate price of the above annual MMBTU is **$313,293,258.62**

Per **https://ww2.energy.ca.gov/almanac/naturalgas_data/overview.html**
Table 1: Natural Gas Demand in California by End Use from 2010 to 2012

Natural Gas by end use (BCF/year)	2010	2011	2012	Average
Residential	509	519	485	504
Commercial	199	201	201	200
Industrial	548	559	577	561
NG Vehicle	18	16	17	17
Electric Power	**922**	**796**	**1,032**	**917**
Total Natural Gas Demand	**2,196**	**2,091**	**2,313**	**2,200**

DCPP Avoided Percentage = **16.11%**

DCPP Avoids 1/6 of California's annual natural gas consumption for electric power

In addition, there is a social cost of carbon associated with DCPP's replacement with natural-gas-fired generation. Here is an analysis taken from part IV of CGNP's written July 25, 2019 testimony to the CPUC in the DCPP Decommissioning cost proceeding A.18-07-013. This portion of CGNP's testimony was subsequently deleted by the CPUC from the comments in the record made by Parties in response to the CPUC report.

Social Cost of Carbon from Closing Diablo Canyon Power Plant in 2024-2025

[31] "Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2015," June, 2015, US Energy Information Administration, https://www.eia.gov/outlooks/archive/aeo15/pdf/electricity_generation_2015.pdf See: Table 1. Estimated levelized cost of electricity (LCOE) for new generation resources, 2020, page 6 of 12.

There is also a Social Cost of Carbon (SC-CO2) for replacing Diablo Canyon with any electricity source, or combination thereof, which emits CO2, SO2, or NOX pollution. The SC-CO2 is meant to be a comprehensive estimate of climate change damages and includes changes in net agricultural productivity, human health, property damages from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. For example: in 2017 California generated an average of 4.6 megawatt hours of electricity for each short ton of CO2e[32] it emitted[33.] Replacing Diablo Canyon with sources emitting greenhouse gases at California's average rate will thus increase California emissions by a minimum of 3.91 million short tons/year.

The U.S. EPA has calculated a social cost of carbon at $42/ton of CO2 in 2024 and $46 per ton in 2025, increasing to a maximum of $69/ton by 2050. Diablo Canyon should be re-licensed to operate for a additional 20-year period.[34] The loss of Diablo Canyon Power Plant would increase California carbon emissions by 82.11 million short tons during these two decades. These increased carbon emissions will cause environmental, health, and other societal damages of $4.375 billion through 2045.

Finally, there is the increased mortality associated with this increased fossil-fired combustion. This burden falls disproportionately on the very young and very old in communities of color (who live in the vicinity of the replacement fossil-fired generation.) The values below were developed prior to 2013, so they do not factor in the deaths caused by higher levels of air pollution causing greater COVID-19 mortality. The Johns Hopkins University COVID-19 tracker **https://coronavirus.jhu.edu/us-map** shows large clusters of disease and death in the vicinity of the coal-fired power plants in the American west.

Hansen and Kharecha[35] utilized values for deaths per terawatt-hour (TWh) for replacement thermal generation in Table 1.

---

[32] "CO_2e", or CO_2 equivalent, is a combined cost representing greenhouse gases CO_2, SO_2, and NO_X in proportion to their cumulative effect on climate.

[33] The Social Cost of Carbon: Estimating the Benefits of Greenhouse Gas Reduction https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html

[34] 2017 California State Emissions: https://www.eia.gov/electricity/state/california/

[35] "Prevented Mortality and Greenhouse Gas Emissions from Historical and Projected Nuclear Power" Pushker A. Kharecha* and James E. Hansen, ***Environmental Science and Technology,*** March 15, 2013, http://pubs.acs.org/doi/pdfplus/10.1021/es3051197 (Enlarged figures available via clicking inside the blue rectangles shown in the online version of the American Chemical Society publication.) NASA Goddard Institute for Space Studies and Columbia University Earth Institute, 2880 Broadway, New York, New York 10025, United States

Coal-fired generation	**mean 28.67 (range 7.15 to 114)**
Natural gas-fired generation	**mean 2.821 (range 0.7 to 11.2)**

During the 20 year period from 2025 to 2045, DCPP would generate approximately 18 * 20 TWh = 360 TWh. Since one possible option is to replace DCPP with imported power from the approximately 6 gigawatts of out-of-state coal-fired generation, using the product of the mean for coal-fired generation and 360 TWh yields 10,321 deaths. If natural-gas-fired generation were used instead, the death toll would be reduced to 1,016. A current government estimate for the value of a life is $10 million.[36]

Upper bound: 10,321 deaths * $10 million = $103.21 billion

Lower bound: 1,016 deaths * $10 million = $10.31 billion

The total cost of shutting down DCPP is the sum of these values:

1. Increased ratepayer burdens (lower bound)	$3.404 billion
2. Social cost of carbon for natural gas fired generation	$4.375 billion
3. Air pollution - caused mortality	$10.31 billion to $103.21 billion
Total cost of closing DCPP in 2025:	**$18.089 to $110.989 billion**

C. Rule 206(b)(5): Practical, Operational, or Other Non-financial Impacts Imposed

The practical, operational, or other nonfinancial impacts imposed as a result of the CPUC's approval of the voluntary plan to close DCPP in 2025 without first properly analyzing the adverse bulk electric system and adverse bulk natural gas system consequences including the environmental, safety and/or reliability impacts of the action or inaction are detailed above in Section IV (A-C).

D. Rule 206(b)(6): Related Proceedings

CGNP recently obtained Party status in FERC Docket EL20-42-000. CGNP's filing in that Docket established that solar power cannot provide reliability benefits for southern California during

[36] "How Government Agencies Determine The Dollar Value Of Human Life" by Sarah Gonzalez, National Public Radio *All Things Considered*. April 23, 20203:59 PM ET https://www.npr.org/2020/04/23/843310123/how-government-agencies-determine-the-dollar-value-of-human-life

WECC's DSW Scenario. EL20-42-000 is focused on a narrow aspect being argued in CGNP's Complaint. Thus, the question of the continued safe operation of DCPP is out of scope for EL20-42-000

E. Rule 206(b)(7): Specific Relief or Remedy Requested

CGNP respectfully requests that a FERC Docket be opened investigating whether the closure of DCPP violates federal reliability standards, based on the issues raised in this Complaint. CGNP respectfully requests an in-depth reliability analysis focused on how the continued safe operation of DCPP provides the reliability benefits previously described.

In connection with this review, CGNP respectfully requests that FERC takes action to enforce NERC's reliability standards, as well as review and initiate remediation of the significant reliability concerns raised in this complaint.

F. Rule 206(b)(8): Documents Supporting Complaint

Copies of the following documents are attached in the referenced appendices in support of the complaint

- CGNP's relevant filings in CPUC Proceedings R1602007 and R2001007 are attached in Appendix 2.
- CGNP's comments to the U.S. Nuclear Regulatory Commission (NRC) regarding DCPP's robust seismic safety are included as Appendix 2.
- CGNP's January 27, 2017 Opening Written comments in CPUC Proceeding A1608006 are included, as well as the transcript of oral cross-examination of the Parties in A1608006 on April 26, 2017, and CGNP's Opening Brief and Reply Brief in Appendix 2.
- Various studies, documents, and tables referenced in the Complaint

G. Rule 206(b)(9): Dispute Resolution

On March 26, 2020, CGNP raised its initial concerns via Certified Mail letters to Teri Donaldson, FERC Inspector General and the CPUC. As a consequence of COVID-19 related closures, additional information was emailed to FERC on March 31, 2020. Copies of both letters are contained in Appendix 2. CGNP also discussed their concerns further in a follow-up phone

call. CGNP's June 16, 2020 letter to the Enforcement Hotline is attached in Appendix 2. There have been numerous emails to FERC online assistance regarding procedural matters. Given the multi-billion dollar amounts at stake, and the unique federal reliability issues appropriate for FERC, the utility of ADR seems unlikely.

H. Rule 206(b)(10): Form of Notice

A form of notice suitable for publication in *The Federal Register* is provided as Appendix A, below.

I. Rule 206(b)(11): Fast Track Processing

CGNP is not requesting fast-track processing of this Complaint.

J. Rule 206(c): Service on Respondents

CGNP confirms that copies of this complaint are being served simultaneously on Respondents, affected regulatory agencies, and others the complainant reasonably knows may be expected to be affected by the complaint:

Kimberly D. Bose, Secretary
Nathaniel J. Davis, Sr., Deputy Secretary
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V. Conclusion

WHEREFORE, for the foregoing reasons, CGNP respectfully requests that the Commission take action to enforce NERC's reliability standards, as well as review and initiate remediation of the significant reliability concerns raised in this complaint.

Respectfully submitted,

Californians for Green Nuclear Power

October 26, 2020

Appendix A

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Californians for Green Nuclear Power, Inc.

Complainant

v. Docket No.

The North American Electric Reliability Corporation,
the Western Electricity Coordinating Council,
the California Independent System Operator,
the California Public Utilities Commission,
the California State Water Resources Control Board,
and the California State Lands Commission

Respondents

NOTICE OF COMPLAINT

( )

Take notice that on October 26, 2020, Californians for Green Nuclear Power, Inc. filed a formal complaint against the Federal Energy Regulatory Commission, the North American Electric Reliability Corporation (NERC,) the Western Electricity Coordinating Council (WECC,) the California Independent System Operator (CAISO), the California Public Utilities Commission (CPUC,) the California State Water Resources Control Board, and the California State Lands Commission pursuant to Pub. L. 109 - 58 - The Energy Policy Act of 2005], 15 U.S. Code Chapter 15B - The Natural Gas Act of 1938, and 49 CFR § 192 - Transportation of natural and other gas by pipeline: Minimum federal safety standards, with relevant subsections as noted in the complaint, alleging that the Respondents failed to properly analyze the adverse bulk electric system and adverse bulk natural gas system consequences in light of known California-specific hazards in connection with the approval of the voluntary plan to close Diablo Canyon Power Plant in 2025.

Complainant Californians for Green Nuclear Power, Inc. certifies that copies of the complaint were served on the contacts for The North American Electric Reliability Corporation, the Western Electricity Coordinating Council, the California Independent System Operator, the California Public Utilities Commission, the California State Water Resources Board, and the California State Lands Commission as listed on the Commission's list of Corporate Officials.

Any person desiring to intervene or to protest this filing must file in accordance with Rules 211 and 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.211 and 385.214). Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a notice of intervention or motion to intervene, as appropriate. The Respondent's answer and all interventions, or protests must be filed on or before the comment

date. The Respondent's answer, motions to intervene, and protests must be served on the Complainants.

The Commission encourages electronic submission of protests and interventions in lieu of paper using the "eFiling" link at http://www.ferc.gov. Persons unable to file electronically should submit an original and 5 copies of the protest or intervention to the Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 20426.

This filing is accessible on-line at http://www.ferc.gov, using the "eLibrary" link and is available for review in the Commission's Public Reference Room in Washington, DC. There is an "eSubscription" link on the web site that enables subscribers to receive email notification when a document is added to a subscribed docket(s). For assistance with any FERC Online service, please email FERCOnlineSupport@ferc.gov, or call (866) 208-3676 (toll free). For TTY, call (202) 502-8659.

Comment Date: 5:00 pm Eastern Time on October 26, 2020

Kimberly D. Bose,
Secretary.

Appendix B

Selected Resources that Detail Federal Concerns Regarding Vulnerability of Natural Gas Pipelines

1. "Improving Energy Security for Air Force Installations" a Ph.D. thesis from the Pardee Rand Graduate school by David Schill, 2015, Rand Corporation, Santa Monica, CA. https://www.rand.org/content/dam/rand/pubs/rgs_dissertations/RGSD300/RGSD361/RAND_RGSD361.pdf The introductory sections compare and contrast the reliability and cost of electricity generation means including natural gas, solar, and wind. Nuclear power is shown to have many advantages relative to the other power generation means including the capability to operate independently of outside energy sources for years at a time.

2. The ShakeOut Scenario Supplemental Study Oil and Gas Pipelines
M 7.8 Southern San Andreas Fault Earthquake Scenario: Oil and Gas Pipelines. Prepared for United States Geological Survey Pasadena CA and California Geological Survey Sacramento CA Under contract to SPA Risk LLC Denver CO By Donald Ballantyne MMI Engineering, Inc. Tacoma WA, May 2008. *See* Page 4 of 12 Vulnerability of Assets Buried pipelines are vulnerable to permanent ground deformation and wave propagation (shaking). Ground deformation can include fault rupture, landslide, and liquefaction and associated lateral spreading and settlement. Pipe damage mechanisms include: compression / wrinkling, joint weld cracking/separation (particularly for oxy-acetylene welds), bending / shear resulting from localized wrinkling, and tension. This earthquake scenario is focusing on an event on the southern segment of the San Andreas Fault that is expected to offset as much as 13 meters (42.6 feet) near the Salton Sea. A 4.5 meter (14.8 feet) offset is expected at Cajon Pass. In addition to lateral movement, there may be an additional vertical offset. The fault offset places the buried pipe in shear, compression, or tension depending on the geometry of the pipe relative to the fault. The preferred alignment would be to place the pipe in pure tension; the worst alignment would place the pipe in pure compression. In tension, steel pipelines with welded joints can distribute tensile strain over hundreds of meters minimizing localized stresses. Anchor points (valves or bends) can result in local stress concentrations. By comparison, pipelines readily wrinkle in compression. *Available at:* **https://tinyurl.com/Ballantyne-2008** This report is included in Appendix 1

3. "Earthquake Resistant Construction of Gas and Liquid Fuel Pipeline Systems Serving, or Regulated by, the Federal Government," FEMA 233, July, 1992. https://www.fema.gov/media-library-data/20130726-1505-20490-1350/fema-233.pdf Note this passage beginning on page 24 of 77. [compressive strains lead to pipeline failure.] ....The most probable causes of large compressive strains in buried pipelines that can lead to buckling are fault movement (including creep), landslides and other massive ground movements.....

4. "Inventory of Lifelines in the Cajon Pass, California," FEMA 225, February, 1992. https://www.fema.gov/media-library-data/20130726-1514-20490-7673/fema_225.pdf Note in particular the section regarding Natural gas pipelines from pages 46-53 of 97.

5. "Collocation Impacts on the Vulnerability of Lifelines During Earthquakes with Applications to the Cajon Pass, California - Study Overview," FEMA 221, October, 1991. https://mitigation.eeri.org/wp-content/uploads/fema-221.pdf Creep" not found. From the executive summary, page 4 of 22, ... At the Cajon Pass over 100 separate collocations involving over 250 potential lifeline interactions were evaluated. The collocations evaluated are identified in Figure 2. In most cases there was a dominant lifeline failure that led to the principal impacts on the other collocated lifelines.
ADDITIONAL CONCLUSIONS
The development of the analysis methodology as well as its test application to the Cajon Pass has highlighted several additional important conclusions.
Earthquake shaking is the dominant factor that leads to building damage. Ground movement is more important for lifeline components, especially buried lifelines and electric transmission towers. There is considerable less available data base on earthquake-induced ground movement compared to shaking intensity data. This suggests that future studies need to emphasize obtaining ground movement information

6. "Collocation Impacts on the Vulnerability of Lifelines During Earthquakes with Applications to the Cajon Pass, California," FEMA 226, February, 1992. https://www.fema.gov/media-library-data/20130726-1514-20490-3354/fema_226.pdf Summary table of additional delays to repairs of fuel lines caused by collocation impacts - Page 87 of 110. "Creep" not found in document.

7. "Seismic Vulnerability and Impact of Disruption of Lifelines in the Conterminous United States," FEMA 224, September, 1991. https://www.fema.gov/media-library-data/20130726-1452-20490-1854/fema_224.pdf 38 instances of "California." 133 instances of "Pipeline." No instances of "Creep"

Appendix C: Hometown Radio 09/09/20 4:00PM:

Dr. Gene Nelson discusses brown outs and nuclear power

September 9, 2020

http://www.920kvec.com/episode/hometown-radio-09-09-20-4p-dr-gene-nelson-discusses-brown-outs-and-nuclear-power/

Download Link:
https://tinyurl.com/GN-09-09-20

GAN note: The total running time for the podcast is about 42 minutes. Host Dave Congalton let me talk for about the first 10 minutes to discuss the problems occurring as a result of California going in the wrong energy direction for a couple of decades. The state opposed nuclear power while favoring solar and wind. While this is an emotionally-appealing narrative, it is not supported by science and engineering.

The result of the experiment to replace reliable, cost-effective , zero-emission nuclear power from San Onofre Nuclear Generating Station (SONGS), which ceased operation at the end of January, 2012 **with the expenditure of well over $10 billion in a buildout of solar and wind is an unreliable power grid that is prone to rotating blackouts**. If DCPP closes as planned in 2025, California's power grid will become much more unreliable. California easily handled a record power demand of 50,270 MW on July 24, 2006 when SONGS was online. Now, the California power grid was brought to near collapse in mid-August, 2020 with a significantly smaller demand.

The real purpose of this massive expenditure appears to be to burnish the reputation of natural gas, which is California's dominant dispatchable energy source, now at about 60%. **While the death toll from radiation from the entire U.S. commercial nuclear power fleet of about 100 reactors in the past six decades is zero, just one natural gas pipeline explosion killed 8 in San Bruno, California a decade ago today.**

For additional details, please contact Dr. Gene Nelson at government@CGNP.org or call his cell at (805) 363 - 4697

Appendix D - Summary of FERC's Responsibilities

https://ferc.gov/about/ferc-does.asp

The Energy Policy Act of 2005 gave FERC additional responsibilities as outlined and updated Strategic Plan. As part of that responsibility, FERC: (Selected bullet points)

- Protects the reliability of the high voltage interstate transmission system through mandatory reliability standards;
- Monitors and investigates energy markets;
- Oversees environmental matters related to natural gas and hydroelectricity projects and other matters

https://ferc.gov/about/strat-docs/strat-plan.asp

FERC's Mission: Economically Efficient, Safe, Reliable, and Secure Energy for Consumers

Assist consumers in obtaining economically efficient, safe, reliable, and secure energy services at a reasonable cost through appropriate regulatory and market means, and collaborative efforts.

Fulfilling this mission involves pursuing three primary goals:

1. Ensure Just and Reasonable Rates, Terms, and Conditions
2. Promote Safe, Reliable, and Secure Infrastructure
3. Mission Support through Organizational Excellence

The following reference establishes the statutory authority for FERC to order CGNP's two requested reliability studies. The final paragraph on page 2 identifies a relevant CPUC General Order and three CFR references. The following narrative cites additional statutory references in the text of footnote 4 appearing at the bottom of page 9, below.

Federal Energy Regulatory Commission FY 2018 – 2022 Strategic Plan, September 2018
https://ferc.gov/about/strat-docs/FY-2018-FY-2022-strat-plan.pdf

[Page 15] "The nation's security and economic prosperity depend on maintaining economically efficient, safe, reliable, and secure energy services at a reasonable cost for consumers. "

[Page 13] Objective 2.2: Minimize risks to the public associated with FERC-jurisdictional energy infrastructure. **The Natural Gas Act and the Federal Power Act, among other statutory authorities, charge FERC with ensuring that energy infrastructure, once authorized, continues to operate safely and reliably.** (Emphasis added.) Failure of LNG or hydropower infrastructure due to structural issues, unsafe operations, natural disasters, cyber and physical attacks, or other hazards can result in loss of life as well as environmental and economic consequences. In addition, the Energy Policy Act of 2005 amended the Federal Power Act to give FERC authority with respect to reliability standards for the bulk-power system and oversight of an Electric Reliability Organization (ERO). [The North American Electric Reliability Corporation] In fulfilling these responsibilities, it is critical that FERC minimize risks to the public associated with FERC-jurisdictional energy infrastructure.

FERC achieves this objective through a range of activities. FERC conducts timely safety reviews and inspections with rigorous requirements, thereby advancing the safety of non-federal hydropower projects and LNG facilities throughout their entire life cycle. FERC also oversees the development and review of mandatory reliability and security standards for the bulk-power system, as well as compliance with these standards. In addition, FERC collaborates with regulated entities and other federal and state governmental agencies to identify and seek solutions to cyber and physical threats to FERC-jurisdictional infrastructure, facilitating proactive efforts that prevent or mitigate loss or damage.

[Page 14] Objective 2.2: Situational Assessment and Strategic Responses
Situational Assessment Item – Public and Environmental Safety impacts
The Commission has witnessed recent incidents at jurisdictional facilities that have highlighted the safety and environmental impacts that can be associated with hydropower **and natural gas infrastructure.** (Emphasis added.)
Strategic Response
The Commission will take additional actions to address emerging public and environmental safety issues:
• Focus on identifying areas for improvement based on the results of the peer review analysis of the Commission's dam safety program performed after the Oroville incident.

• Continue to improve the Commission's compliance program to ensure that the regulated community is held to the high standards set forth in project-specific certificate conditions. ...

[Page 15]

Core Function 2.2.2: Protect and improve the reliable and secure operation of the bulk-power system by identifying reliability and security risks; overseeing the development, implementation and enforcement of mandatory reliability standards; and promoting the resilience, reliability and security of the bulk-power system. (Emphasis added.)

The nation's bulk-power system is the backbone of the economy, delivering essential services to end users every moment of every day. FERC promotes the reliability of that system through oversight of the ERO, which develops mandatory reliability and security standards in the United States and enforces compliance with those standards through audits, investigations, and proposed penalties. In its oversight role, FERC reviews reliability and security standards proposed by the ERO. For proposed standards, the Commission may issue an order to accept, remand, or direct modifications. FERC reviews documentation supporting ERO audits, investigations, and proposed penalties and remediation for non-compliance. FERC also gathers information through near-real-time monitoring of the grid, obtaining supplementary data on grid functionality through data services and coordination with facility owners and operators. FERC maintains an up-to-date knowledge on grid technologies and changes in the bulk-power system to assess potential risks to reliability and opportunities to improve reliability. In addition, FERC engages with stakeholders and experts, sometimes by hosting technical conferences, to better monitor the cyber security landscape and remain abreast of trends that may affect bulk-power system reliability.

[Page 17] Objective 2.2 Performance Measures

... The change in frequency and elapsed time from the initial disturbance to the frequency minimum

This measure assesses the performance of the three U.S. interconnections in providing primary frequency response. Frequency response is a measure of an interconnection's ability to stabilize frequency immediately following the sudden loss of generation or load. It is a critical aspect of the reliable operation of the bulk-power system, particularly during disturbances and restoration. Maintaining the capability to provide primary frequency

response was the purpose of Order No. 842 (Essential Reliability Services and the Evolving Bulk-Power System — Primary Frequency Response). 4 ...

Footnote 4: **Essential Reliability Services and the Evolving Bulk-Power System – Primary Frequency Response, Order No. 842**, 83 Fed. Reg. 9,636 (Mar. 6, 2018), 162 FERC ¶ 61,128, order on clarification and reh'g, 164 FERC ¶ 61,135 (2018), available at https://www.ferc.gov/media/news-releases/2018/2018-1/02-15-18-E-2.asp.